

CLAIMS

1. A vehicle simulator comprising:

(i) a real-world vehicle whose controls and instruments are dual-mode such that they can be switched between normal operation and simulated operation;

(ii) a retro-reflecting screen which is deployed around and outside windows of a control area of the vehicle, which control area is for a person operating the simulator;

(iii) an image projector for being mounted on a head or headwear of the operator;

(iv) a head position and orientation system mounted on the head or the headwear of the operator;

(v) a simulator host computer that receives information from controls of the vehicle and sends information to the controls and to instruments of the vehicle when the vehicle is in a simulation mode; and

(vi) an image generator computer that receives data from the simulator host computer regarding the vehicle's simulated position and orientation and that also receives data from the head position and orientation sensing system regarding the operator's head position and orientation, and that sends a computed image to the image projector.

2. A vehicle simulator according to claim 1 in which the real-world vehicle is a road vehicle, in which the operator

is a driver, and in which the control area is a cab of the road vehicle.

3. A vehicle simulator according to claim 1 in which the real-world vehicle is an aircraft, in which the operator is a pilot, and in which the control area is a cockpit of the aircraft.

4. A simulator according to claim 3 in which the simulator is installed in an aircraft hanger.

5. A simulator according to claim 1 in which the real-world vehicle is a ship or a boat, in which the operator is a pilot, and in which the control area is a bridge or cockpit of the ship or boat.

6. A simulator according to claim 1 in which the image projector has a small exit pupil such that its depth of field at various distances from the retro-reflecting screen is sufficient to prevent de-focus of the picture as the operator looks around.

7. A simulator according to claim 1 in which the image projector includes an auto-focus mechanism for maintaining focus as the projection distance varies.

8. A simulator according to claim 1 in which the projector is a small high-resolution flat panel display projector.

10. A simulator according to claim 1 in which the projector is a small high-resolution flat panel display projector.